

WHAT IS CLAIMED IS:

1. An apparatus including an electrostatic discharge (ESD) protection structure with a diac, comprising:

one or more reference electrodes;

a circuit electrode;

a semiconductor material of a first conductivity type in electrical communication with one or more of said one or more reference electrodes;

a first semiconductor region of said first conductivity type disposed on said semiconductor material and in electrical communication with at least one of said one or more reference electrodes;

a second semiconductor region of a second conductivity type disposed on said semiconductor material proximate said first semiconductor region and in electrical communication with said at least one of said one or more reference electrodes;

a first semiconductor well of said second conductivity type disposed in said semiconductor material;

a second semiconductor well of said first conductivity type disposed in said first semiconductor well;

a third semiconductor region of said first conductivity type disposed on said second semiconductor well and in electrical communication with said circuit electrode; and

a fourth semiconductor region of said second conductivity type disposed on said second semiconductor well and in electrical communication with said circuit electrode.

2. The apparatus of claim 1, wherein:

    said first conductivity type comprises P-type; and

    said second conductivity type comprises N-type.

3. The apparatus of claim 1, wherein:

    each of said semiconductor material, said second semiconductor well, and said first and third semiconductor regions has a respective dopant concentration; and

    said first and third semiconductor region dopant concentrations are greater than said semiconductor material and second semiconductor well dopant concentrations, respectively.

4. The apparatus of claim 1, wherein said semiconductor material comprises a substrate for an integrated circuit.

5. The apparatus of claim 1, further comprising a substrate for an integrated circuit, wherein said semiconductor material is disposed on said integrated circuit substrate.

6. The apparatus of claim 1, wherein said circuit electrode comprises a signal interface for said integrated circuit.

7. An apparatus including an electrostatic discharge (ESD) protection structure with a diac, comprising:

one or more reference electrodes;

a circuit electrode;

a semiconductor material of a first conductivity type in electrical communication with one or more of said one or more reference electrodes;

a first semiconductor region of said first conductivity type disposed on said semiconductor material and in electrical communication with at least one of said one or more reference electrodes;

a second semiconductor region of a second conductivity type disposed on said semiconductor material proximate said first semiconductor region and in electrical communication with said at least one of said one or more reference electrodes;

a first semiconductor well of said second conductivity type disposed in said semiconductor material;

a second semiconductor well of said second conductivity type disposed in said first semiconductor well;

a third semiconductor well of said first conductivity type disposed in said second semiconductor well;

a third semiconductor region of said first conductivity type disposed on said third semiconductor well and in electrical communication with said circuit electrode; and

a fourth semiconductor region of said second conductivity type disposed on said third semiconductor well and in electrical communication with said circuit electrode.

8. The apparatus of claim 7, wherein:

said first conductivity type comprises P-type; and

said second conductivity type comprises N-type.

9. The apparatus of claim 7, wherein:

each of said semiconductor material, said third semiconductor well, and said first and third semiconductor regions has a respective dopant concentration; and

said first and third semiconductor region dopant concentrations are greater than said semiconductor material and third semiconductor well dopant concentrations, respectively.

10. The apparatus of claim 7, wherein said semiconductor material comprises a substrate for an integrated circuit.

11. The apparatus of claim 7, further comprising a substrate for an integrated circuit, wherein said semiconductor material is disposed on said integrated circuit substrate.

12. The apparatus of claim 7, wherein said circuit electrode comprises a signal interface for said integrated circuit.

13. An apparatus including an electrostatic discharge (ESD) protection structure with a diac, comprising:

one or more reference electrodes;

a circuit electrode;

a semiconductor material of a first conductivity type in electrical communication with one or more of said one or more reference electrodes;

a first semiconductor region of said first conductivity type disposed on said semiconductor material and in electrical communication with at least one of said one or more reference electrodes;

a second semiconductor region of a second conductivity type disposed on said semiconductor material proximate said first semiconductor region and in electrical communication with said at least one of said one or more reference electrodes;

a semiconductor layer of said second conductivity type disposed in said semiconductor material;

a first semiconductor well of said second conductivity type disposed on said semiconductor layer;

a second semiconductor well of said first conductivity type disposed in said first semiconductor well;

a third semiconductor region of said first conductivity type disposed on said second semiconductor well and in electrical communication with said circuit electrode; and

a fourth semiconductor region of said second conductivity type disposed on said second semiconductor well and in electrical communication with said circuit electrode.

14. The apparatus of claim 13, wherein:

    said first conductivity type comprises P-type; and

    said second conductivity type comprises N-type.

15. The apparatus of claim 13, wherein:

    each of said semiconductor material, said second semiconductor well, and said first and third semiconductor regions has a respective dopant concentration; and

    said first and third semiconductor region dopant concentrations are greater than said semiconductor material and second semiconductor well dopant concentrations, respectively.

16. The apparatus of claim 13, wherein said semiconductor material comprises a substrate for an integrated circuit.

17. The apparatus of claim 13, further comprising a substrate for an integrated circuit, wherein said semiconductor material is disposed on said integrated circuit substrate.

18. The apparatus of claim 13, wherein said circuit electrode comprises a signal interface for said integrated circuit.